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Influence of Cations on the Formation of Cobalt(II) Complexes with Thiocyanate Ions in Solutions of Nonionic Micelles

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Abstract

The influence of additives of alkali, alkaline-earth, and several transition metal cations, protonated amines, and quaternary ammonium on the state of the tetrahedral cobalt(II) thiocyanate complex is studied in an aqueous solution of the nonionogenic surfactant Triton X-100. It is shown that alkali and alkaline-earth metal cations and compounds containing protonated primary amino groups favor the formation of additional amounts of the micellar-bonded [Co(NCS)4]2- complex anion. This fact is explained by the interaction of these cations with the oxyethylene chains of the nonionogenic surfactant as was observed in the crown ether coordination. This provides the formation and transfer into micelles of additional amounts of their associates with [Co(NCS)4]2-. The Mn2+, Ni2+, and Cd2+ cations decompose cobalt tetrathiocyanate due to the formation of their own complexes with the ligand. This effect is not observed in the case of the quaternary ammonium compounds, which is explained by their incapability of coordinating the oxyethylene chains of the nonionogenic surfactant.

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